

# SERVICE MANUAL

1154

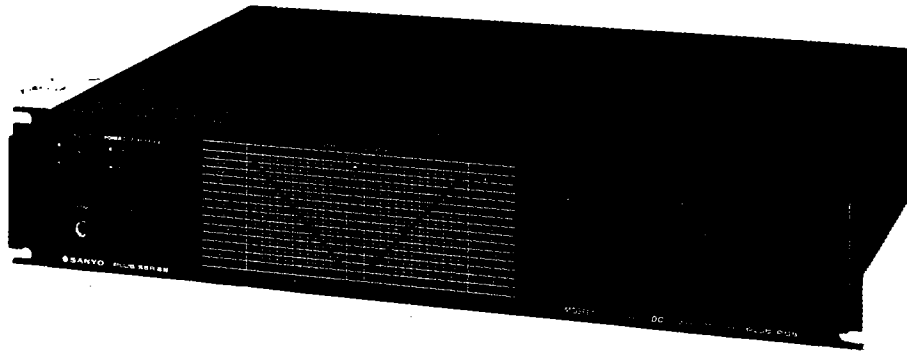
## FET STEREO POWER AMPLIFIER



# SANYO

## PLUS P55

(U.S.A.)



### SPECIFICATIONS

**Continuous minimum sine wave RMS power output per channel at 8 ohms from 20Hz to 20kHz with no more than 0.009%(NORMAL) 0.03%(STRAPPED MONO) harmonic distortion.**  
(NORMAL) 100 watts  
(STRAPPED MONO) 200 watts

Damping factor	
NORMAL	60 (at 1kHz 8 ohms)
STRAPPED MONO	40 (at 1kHz 8 ohms)
Input sensitivity and impedance	
NORMAL	1V/47 kohms
STRAPPED MONO	0.7V/47k ohms

Intermodulation distortion (60Hz:7kHz - 4:1)	
NORMAL	0.009%(100W output, 8 ohms)
STRAPPED MONO	0.03%(200W output, 8 ohms)
Transient response: Slew rate	
NORMAL	150V/ $\mu$ sec
Frequency response (1W output, 8 ohms)	
NORMAL	DC - 100kHz (+0/-1dB)
STRAPPED MONO	DC - 100kHz (+0/-2dB)
Signal to noise ratio	
NORMAL (IHF-A curve)	110dB
Power requirements	AC 120V, 60Hz
Power consumption	400W
Dimensions (Approx.)	440(W) x 320(D) x 88(H)mm (17-3/8" x 12-9/16" x 3-1/2")
Weight (Approx.)	12 kg

\* Specifications are subject to change without notice.

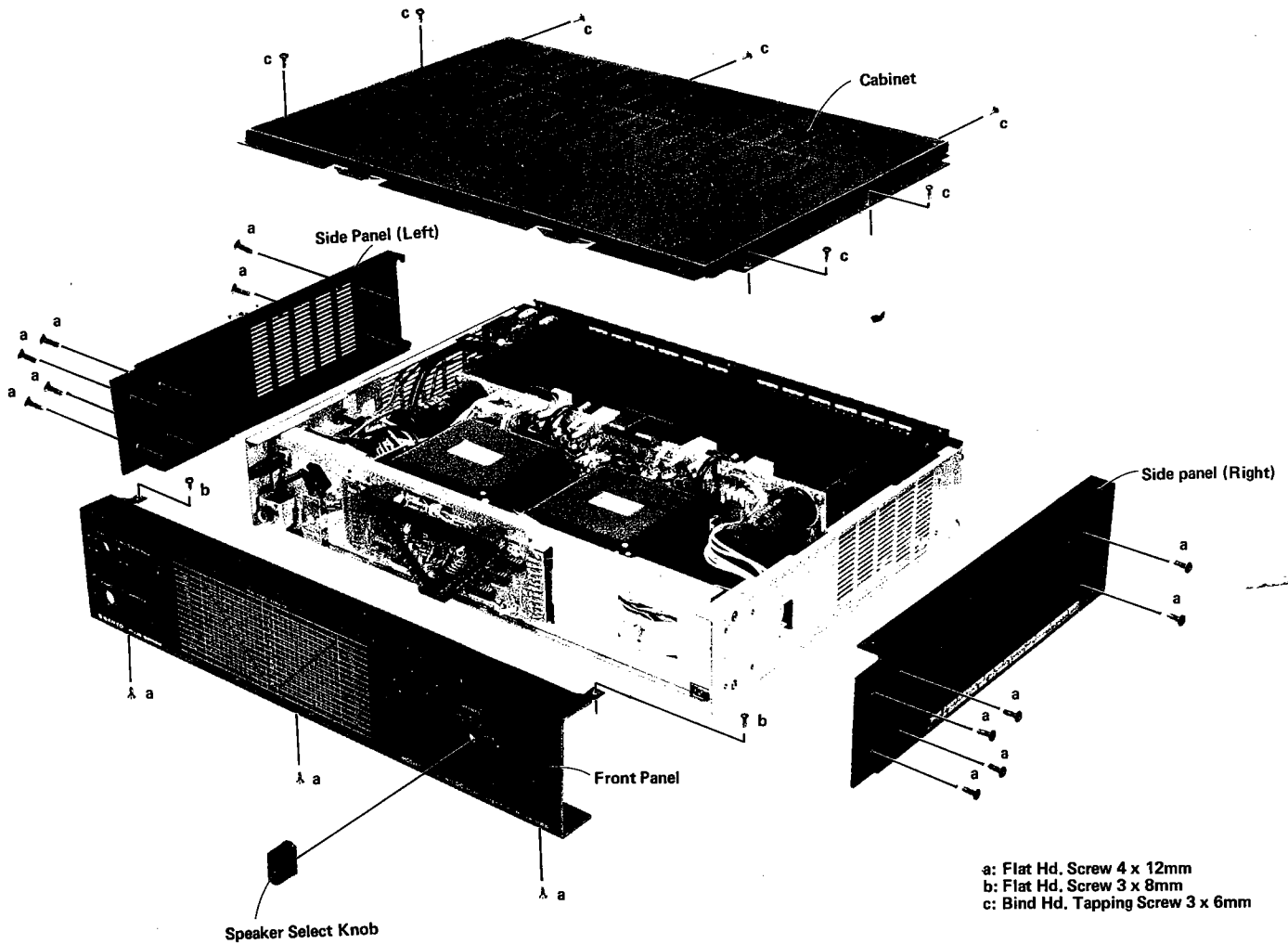
## HOW TO REMOVE THE CABINET AND PANELS

Be sure to have the power cord pulled out from the consent.

- 1) Unscrew 12 (flat head 4 x 12 mm) screws fastening both side panels.
- 2) Remove five (two flat head 4 x 12 mm and three flat head tapping 3 x 8 mm) screws fastening the front panel.

3) As the head less w/Hex hole 3 x 4 mm screw fastening the speaker change-over switch is unscrewed, the front panel can then be removed.

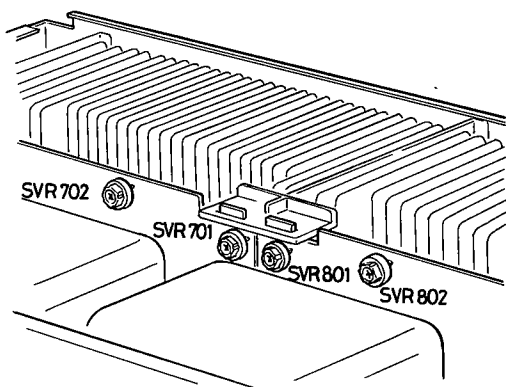
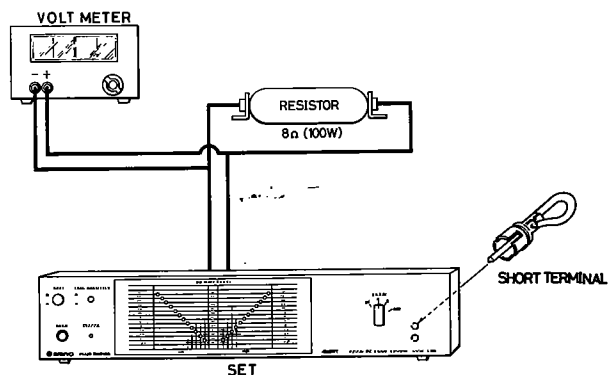
- 4) As seven (baird head tapping 3 x 6 mm) screws fastening the cabinet are unscrewed, the surroundings of the set amounts to being removed.



## ADJUSTMENT

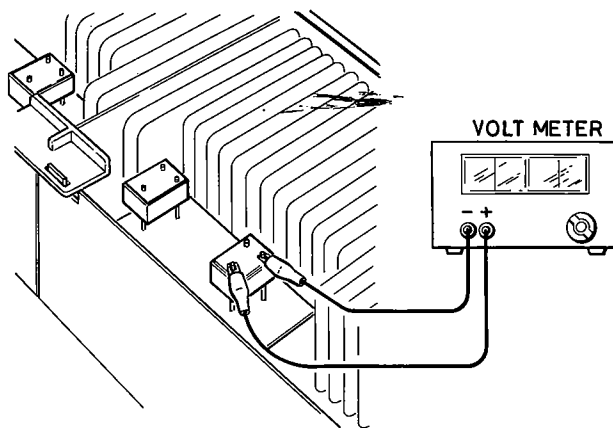
### Middle Point Potential Adjustment

- 1) Set the output display change-over switch in the "x1" position; the mode switch, the "STEREO" position; and the speaker switch, the "A" position, respectively.
- 2) Short circuit the main amp. input terminals (MAIN IN) as shown in the figure to achieve the state of short of the input.
- 3) Connect a 8-ohm (100 W) resistor and digital voltmeter to the speaker output terminals (SPEAKERS) "A".
- 4) Turn on the power switch, and adjust semifixed resistor SVR701 (SVR801) so that the indicated value of the digital voltmeter becomes within 10 mV.



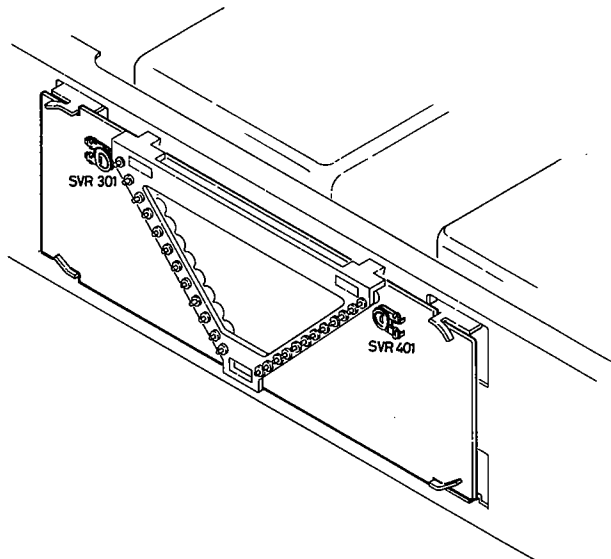
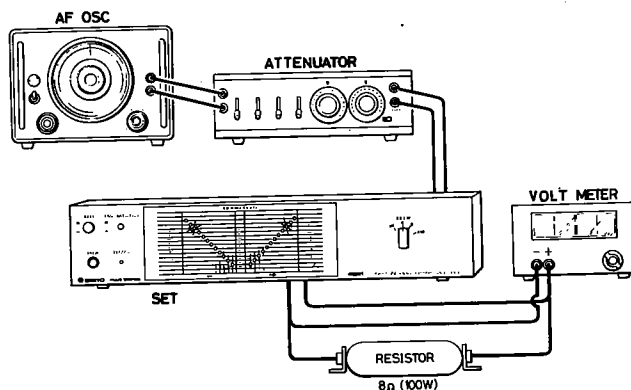
### Power Stage Current Adjustment

- 1) Achieve the state of short of the input.
- 2) Adjust resistor SVR702 so that the sum of voltages of R735 both ends and R734 both ends of the cemented resistor becomes 50 mV. (Keeping either of the two — R735 and R736 — fixed, adjust so that the sum total of values appeared becomes 50 mV.)
- 3) Confirm that the sum of voltages of R737 both ends and R738 both ends of the cemented resistor has become 50 mV.
- 4) Next, adjust resistor SVR802 so that the sum of voltages of both ends of R835 and R836 becomes 50 mV.
- 5) Similar to Step 3, confirm that the sum of voltages of R837 and R838 has become 50 mV.

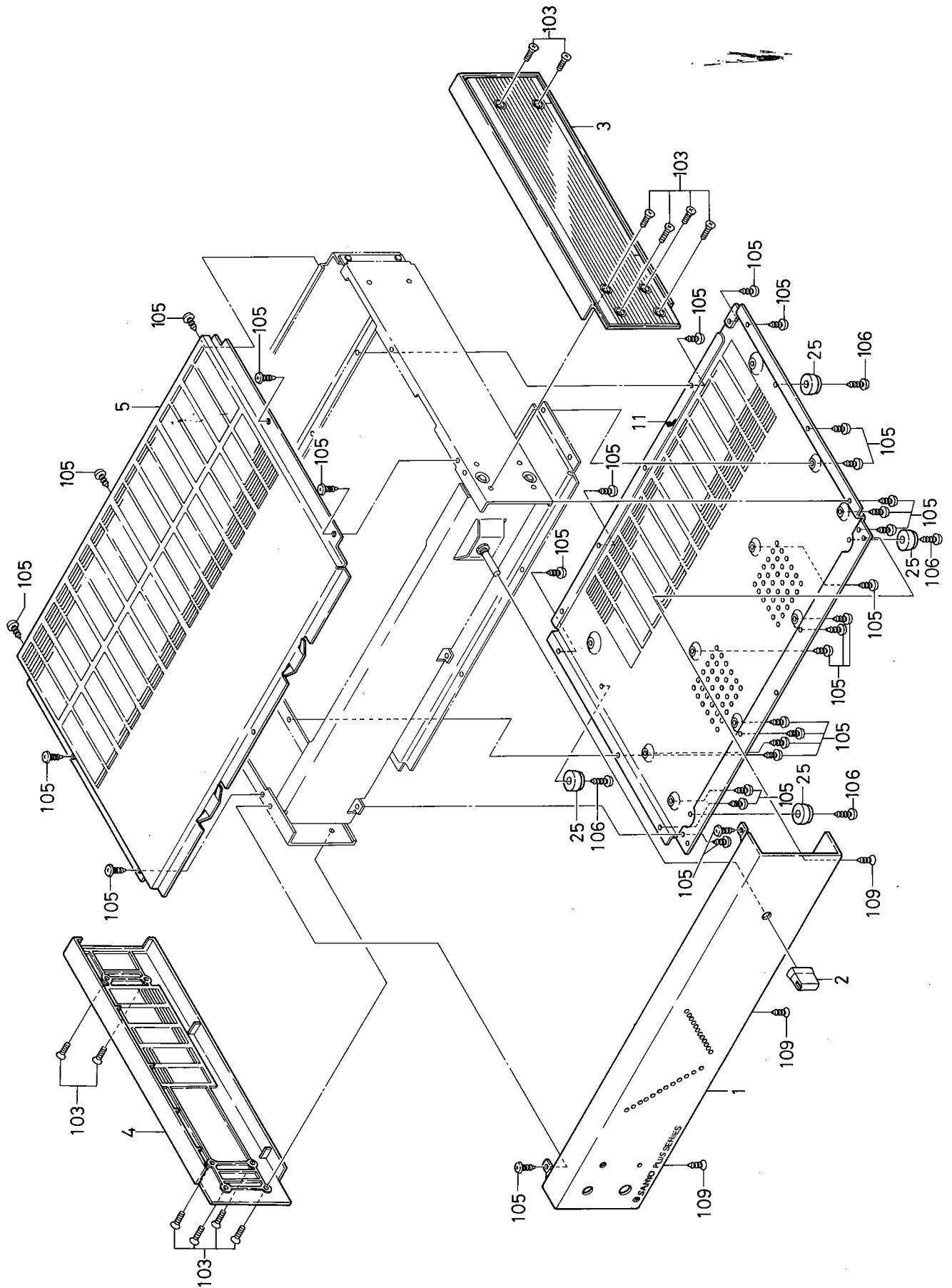


### Adjustment of Level Meter

- 1) Introduce 1 kHz input to the set, and adjust so that its output becomes 100 W. (If voltage of a 8-ohm resistor is 28.3 V, this is also acceptable.)
- 2) Adjust resistors SVR301 and SVR401 so that a red LED, third from the top, of the LED level meter lights up.



# CABINET EXPLODED VIEW



**PARTS LIST**

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
<b>PACKING</b>				<b>ELECTRICAL PARTS</b>			
	141-6-133T-10300	Individual Carton	1	51	4-300T-08500	Power Trans, L Channel	1
	141-6-144T-61000	Form Plastic Case, Left	1	52	4-300T-08600	Power Trans, R Channel	1
	141-6-144T-61100	Form Plastic Case, Right	1	53	4-243T-81271	Power Cord	1
	141-6-231T-45602	Inner Poly Cover, Set	1	54	4-237T-07000	Terminal Board, Speaker	1
	141-6-231T-25350	Inner Poly Cover, Inst. M	1	55	141-2-382T-07000	Terminal, Ground	2
	141-6-231T-15200	Inner Poly Cover, Handle	1	56	4-238T-12373	Special Switch	2
	141-2-246T-16800	Sheet, Handle	1	57	4-209T-01172	Posistor	2
	141-6-317T-19500	Pad, Handle	1	58		Transistor FET 23K134	4
<b>ACCESSORY</b>				59		Transistor FET 2SJ49	4
	141-6-410T-39000	Instruction Manual	1	60	4-235T-44871	Socket, Headphon W/Nut	1
	141-0-271T-16400	Bracket Ass'y, Handle	2	61	123-2-472R-00401	Lug, C931, 932	4
	141-2-171T-16500	Handle	2	62		Ceramic Cap. 0.047μF 50V +80-20%	2
	4-243T-13375	Flat Hd. Screw 3x14 Lead Cord, RCA - RCA	4 1	63	141-4-464T-20600	Fixer	5
<b>CABINET</b>				64	141-4-464T-20672	Fixer	1
1	141-0-122T-32900	Front Panel Ass'y	1	<b>POWER AMP (L) PCB ASS'Y</b>			
2	141-0-163T-63630	Rotary Knob Ass'y, Function	1	81	141-4-233T-30700	P.C Board Ass'y, Power Amp L	1
3	141-0-123T-05500	Side Panel Ass'y	1		4-235T-80200	Socket 4P	1
4	141-0-123T-05600	Side Panel Ass'y	1		4-235T-79900	Socket 3P	1
5	141-2-111T-42900	Cabinet	1		4-236T-10274	Plug 3P-25P	1
<b>CHASSIS</b>					4-236T-13472	Pulg 3P	1
11	141-2-125T-19400	Bottom Lid	1	SVR701	4-222T-62071	Semifixed Variable Resistor 100 ohm	1
12	141-2-214T-04800	Bracket, Frame	1	SVR702	4-222T-62073	Semifixed Variable Resistor 220 ohm	1
13	141-2-315T-21200	Reinforcement, Right	1		4-232T-05200	Relay, 24V	2
14	141-2-315T-21300	Reinforcement, Left	1	Q701		Transistor FET 2SK150	1
15	141-2-315T-21400	Reinforcement, Power Trans	1	Q702		Transistor 2SC2291	1
16	141-2-119T-00300	Back Panel	1	Q703,704		Transistor 2SD755	2
17	141-2-368T-19000	Heat Sink	1	Q706,707, 708		Transistor 2SB648A	3
18	141-2-210T-19900	Bracket, Amp Center	1	Q709,710		Transistor 2SD668A	2
19	141-2-210T-20000	Bracket, Amp Side	2	Q705,601, 602,603		Transistor 2SC945	4
20	141-2-210T-20200	Bracket, Capacitor	2	Q604		Transistor 2SD438	1
21	141-2-210T-19800	Bracket, LED	1	D731		Diode M4C51	1
22	141-2-310T-35600	Bracket, Headphone	1	D608,609		Diode 1N4003	2
23	141-2-310T-35700	Bracket, Range Switch	1	D701		Zener Diode XZ162	1
24	141-2-310T-35800	Bracket, Power Switch	1	D702		Zener Diode XZ200	1
25	141-0-174T-05101	Stand Ass'y	4	D607		Diode YZ047	1
26	141-0-161T-74100	Push Button Ass'y, Range Switch	1	D703,601, 602,603, 604,605, 606		Diode DS442 X	7
27	141-0-156T-21730	Knob Ass'y Power Switch	1	<b>CAPACITORS</b>			
28	141-2-464T-11800	Fixer, AC Cord	1	C601		Electrolytic 100μF 25V Nonpolar	1
29	141-2-135T-66800	Cover	1	C602		Electrolytic 220μF 10V	1
<b>HARDWARE</b>				C704		Electrolytic 47μF 35V	1
101		Screw Pan Hd. 2.6x4mm	2	C708		Electrolytic 47μF 25V	1
102		Screw Pan Hd. 3x18mm	16	C702		Ceramic 15pF 500V ±10%	1
103		Flat Hd. 4x12mm	12	C712		Ceramic 10pF 500V ±10%	1
104		Bind Hd. 3x6mm	12	C733,734, 735,736		Ceramic 0.01μF 500V +100-0%	4
105		Bind Hd. Tapping 3x6mm	39	C711,706		Ceramic 47pF 50V ±10%	2
106		Bind Hd. Tapping 3x8mm	27	C705		Ceramic 15pF 50V ±10%	1
107		Bind Hd. Tapping 3x12mm	2	C701		Mylar 470pF 50V ±10%	1
108		Bind Hd. Tapping 4x10mm	8	C703		Mylar 0.001μF 50V ±10%	1
109		Flat Hd. 3x8mm	3	C731,732		Electrolytic 10000μF 63V	2
110		Washer 3mm	1	C710,711		Electrolytic 47μF 63V	2
111		Washer 4x8x0.8mm	8	C709		Electrolytic 10μF 25V	1
112		Washer 3mm	16	<b>RESISTORS</b>			
113		Ext. Tooth Lock Washer 2.6mm	3	R708,719		Solid 5.6K ohm ±10% 1/2W	2
114		Ext. Tooth Lock Washer 3mm	2	R925,926		Solid 4.7K ohm ±10% 1/2W	2
115		Pan Hd. Tapping Screw W/Washer 3x8mm	4	R727,728		Solid 8.2K ohm ±10% 1/2W	2
				R703		Carbon 56K ohm ±5% 1/4W	1
				R604,605, 620		Carbon 47K ohm ±5% 1/4W	3
				R601,602, 603		Carbon 33K ohm ±5% 1/4W	3
				R608,609		Carbon 18K ohm ±5% 1/4W	2

PARTS RIST

Key No.	Part No.	Description	Q'ty	Key No.	Part No.	Description	Q'ty
<b>POWER AMP (L) PCB ASS'Y</b>				<b>POWER AMP (R) PCB ASS'Y</b>			
R705,706		Carbon 15K ohm ±5% 1/4W	2	R808,819		Solid 5.6K ohm ±10% 1/2W	2
R606,607		Carbon 56K ohm ±5% 1/4W	2	R827,828		Solid 8.2K ohm ±10% 1/2W	2
R722		Carbon 5.6K ohm ±5% 1/4W	1	R803		Carbon 56K ohm ±5% 1/4W	1
R710,711		Carbon 4.7K ohm ±5% 1/4W	2	R805		Carbon 15K ohm ±5% 1/4W	1
R707		Carbon 3.9K ohm ±5% 1/4W	1	R921,922		Carbon 12K ohm ±5% 1/4W	2
R718		Carbon 3.3K ohm ±5% 1/4W	1	R913,914		Carbon 10K ohm ±5% 1/4W	2
R721		Carbon 2.7K ohm ±5% 1/4W	1	R917,918		Carbon 8.2K ohm ±5% 1/4W	2
R720		Carbon 2.2K ohm ±5% 1/4W	1	R822		Carbon 5.6K ohm ±5% 1/4W	1
R701,702,704		Carbon 560 ohm ±5% 1/4W	3	R810,811		Carbon 4.7K ohm ±5% 1/4W	2
R709		Carbon 150 ohm ±5% 1/4W	1	R807,915,916		Carbon 3.9K ohm ±5% 1/4W	3
R724		Carbon 56 ohm ±5% 1/4W	1	R818		Carbon 3.3K ohm ±5% 1/4W	1
R611		Carbon 100 ohm ±5% 1/4W	1	R821		Carbon 2.7K ohm ±5% 1/4W	1
R712,713		Carbon 82 ohm ±5% 1/4W	2	R820		Carbon 2.2K ohm ±5% 1/4W	1
R716,717		Carbon 82 ohm ±5% 1/4W	2	R801,802,804		Carbon 560 ohm ±5% 1/4W	3
R612		Carbon 15K ohm ±5% 1/4W	1	R809		Carbon 150 ohm ±5% 1/4W	1
R714,715		Carbon 1K ohm ±5% 1/4W	2	R824		Carbon 100 ohm ±5% 1/4W	1
R725,726,723		Carbon 100 ohm ±5% 1/4W	3	R812,813		Carbon 82 ohm ±5% 1/4W	2
<b>POWER AMP (R) PCB ASS'Y</b>				<b>RESISTORS</b>			
82	141-4-233T-30800	P.C. Board Ass'y, Power Amp. R	1	R816,817		Carbon 82 ohm ±5% 1/4W	2
	4-235T-80271	Socket 4P	1	R814,815		Carbon 1K ohm ±5% 1/4W	2
	4-235T-79900	Socket 3P	1	R825,826,823		Carbon 100 ohm ±5% 1/4W	3
	4-236T-13475	Plug 6P	1	R911,912,923,924		Carbon 5.6 ohm ±5% 1/4W	4
SVR801	4-222T-62071	Semifixed Variable Resistor 100 ohm	1	R919,920		Metal 20K ohm ±1% 1/4W	2
SVR802	4-222T-62073	Semifixed Variable Resistor 220 ohm	1	<b>POWER FET PCB ASS'Y</b>			
	141-2-368T-13801	Heat Sink	2	83	141-4-233T-30900	P.C. Board Ass'y, Power FET	1
	141-2-243T-09800	Base	1		4-235T-80300	Socket	4
	141-2-327T-18200	Insulator	2		4-236T-12971	Plug 4P	1
Q801		Transistor FET 2SK150	1		4-236T-10200	Plug	1
Q802		Transistor 2SC2291	1	L701	4-265T-05800	VHF Coil	1
Q803,804		Transistor 2SD755	2	Q711		Transistor 2SC2320	1
Q806,807,808		Transistor 2SB648A	3	Q712		Transistor 2SA999	1
Q809,810		Transistor 2SD668A	2	D711,712,713,714		Diode DS442 X	4
Q914		Transistor 2SA1019	1	<b>CAPACITORS</b>			
Q913		Transistor 2SC2375	1	C721,722		Mylar 0.0082μF 50V ±20%	2
Q804		Transistor 2SC945	1	C725		Mylar 0.047μF 50V ±20%	1
Q912		Transistor 2SB677	1	C723,724		Electrolytic 0.047μF 150V	2
Q911		Transistor 2SD687	1	<b>RESISTORS</b>			
D831		Diode M4C51	1	R743		Metal 10 ohm ±5% 1W	1
D910		Diode W02	1	R742		Metal 5.6 ohm ±5% 2W	1
D801		Zener Diode XZ162	1	R739,740		Carbon 1K ohm ±5% 1/4W	2
D802,911,912		Zener Diode XZ200	3	R731,732,733,734		Carbon 330 ohm ±5% 1/4W	4
D803		Diode DS442 X	1	R735,736,737,738	4-221T-03600	Resistor 0.47 ohm 5W x 2	2
<b>CAPACITORS</b>				<b>POWER SWITCH PCB ASS'Y</b>			
C804		Electrolytic 47μF 35V	1	84	141-4-233T-31000	P.C. Board Ass'y, Power Switch	1
C808,917,918		Electrolytic 47μF 25V	3		4-238T-07971	Push Switch	1
C809		Electrolytic 10μF 25V	1		4-227T-01000	CR Pack	2
C802		Ceramic 15pF 500V ±10%	1	<b>LED/DRIVE PCB ASS'Y</b>			
C812		Ceramic 10pF 500V ±10%	1	85	141-4-233T-31200	P.C. Board Ass'y, LED/Drive	1
C833,834,835,836,912		Ceramic 0.01μF 500V +100-0%	5		141-2-210T-19800	Bracket	1
C811,706		Ceramic 47pF 50V ±10%	2		4-235T-80000	Socket 6P	1
C919,920		Ceramic 0.01μF 50V +80-20%	2	SVR301,401	4-222T-39575	Semifixed Variable Resistor	2
C802		Ceramic 15pF 50V ±10%	1	IC301,401		IC NJM 4558D } or IC RC4558P	2
C801		Mylar 470pF 50V ±10%	2				
C803		Mylar 0.001μF 50V ±10%	1				
C831,832		Electrolytic 10000μF 63V	2				
C913,914		Electrolytic 220μF 100V	2				
C810,811		Electrolytic 47μF 63V	2				
C915,916		Electrolytic 47μF 100V	2				

**PARTS LIST**

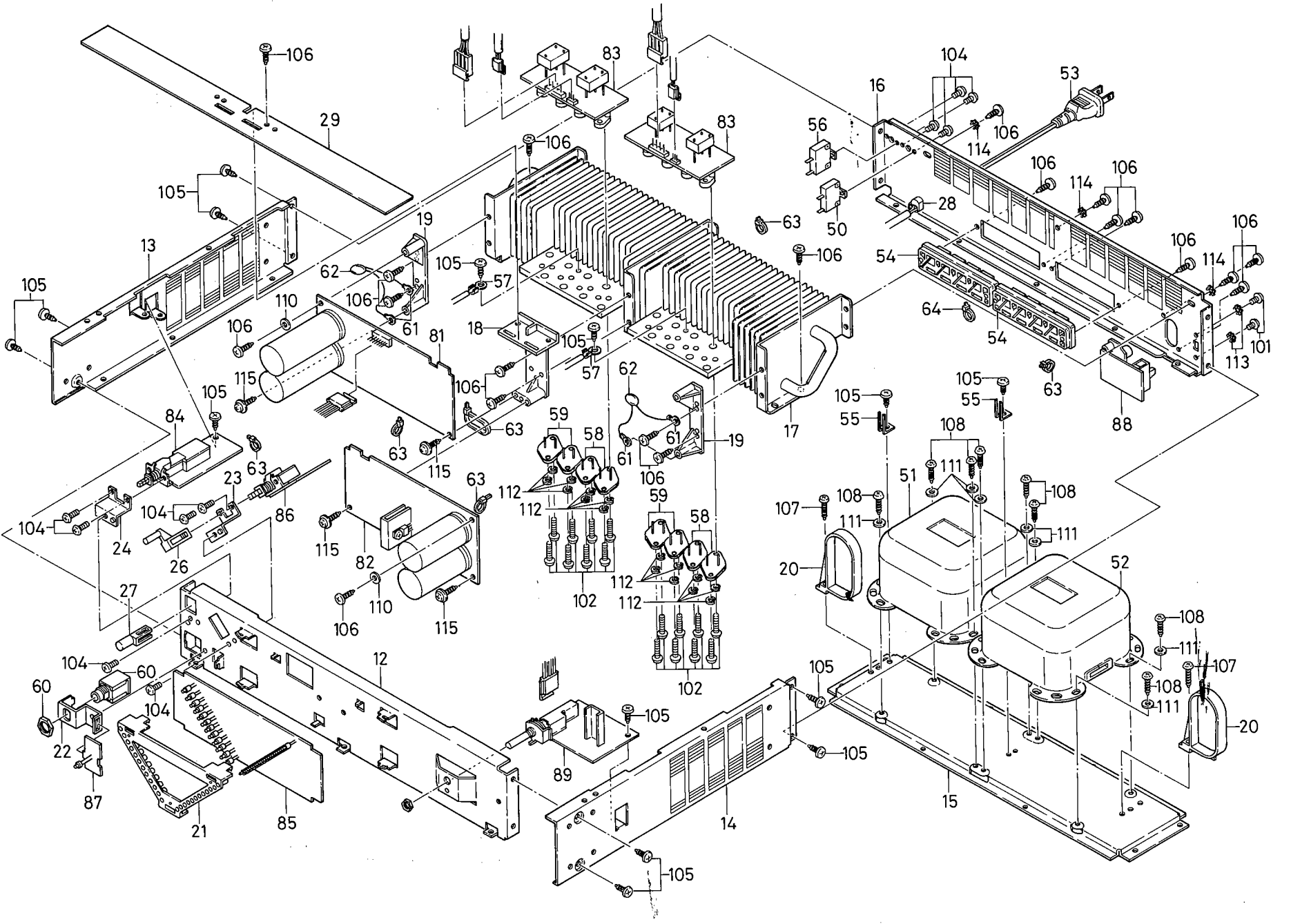
Key No.	Part No.	Description	Qty
<b>LED/DRIVE PCB ASS'Y</b>			
IC302~ 304, 402, 404 D301,302, 303,401, 402,403 O301,401 LED304~ 312, 404~ LED301~ 303, 401~ 403		IC LM324N  Diode DS442 X  Transistor 2SC945 LED SLP244B B Green  LED SLP144B B Red	6 6 2 18 6
<b>CAPACITORS</b>			
C302,905, 906,402, 303,403 C301,401		Electrolytic 1µF 50V  Ceramic 100pF 50V ±10%	6 2
<b>RESISTORS</b>			
R308,408 R306,307, 308,406, 407,408 R309,409 R304,303, 404,403 R310,311, 410,411, R324,424 R334,335, 336,434, 435,436 R323,423 R322,422 R325,326, 327,425, 426,427 R328,329, 330,428, 429,430 R331,332, 333,431, 432,433 R321,421 R301 R320,420 R319,419 R318,418 R314,414 R317,417 R315,316, 415,416 R313,413 R312,412		Metal 10K ohm ±10% 1/4W Metal 20K ohm ±10% 1/4W Carbon 100K ohm ±5% 1/4W Carbon 15K ohm ±5% 1/4W Carbon 10K ohm ±5% 1/4W Carbon 10K ohm ±5% 1/4W Carbon 2.2K ohm ±5% 1/4W Carbon 2.2K ohm ±5% 1/4W Carbon 1.5K ohm ±5% 1/4W Carbon 1.2K ohm ±5% 1/4W Carbon 1.2K ohm ±5% 1/4W Carbon 1.2K ohm ±5% 1/4W Carbon 1.2K ohm ±5% 1/4W Carbon 1K ohm ±5% 1/4W Carbon 2.2K ohm ±5% 1/4W Carbon 470 ohm ±5% 1/4W Carbon 330 ohm ±5% 1/4W Carbon 270 ohm ±5% 1/4W Carbon 180 ohm ±5% 1/4W Carbon 150 ohm ±5% 1/4W Carbon 100 ohm ±5% 1/4W Carbon 47K ohm ±5% 1/4W Carbon 2.2K ohm ±5% 1/4W	2 2 2 2 4 2 2 6 6 2 2 2 2 2 2 2 2 2 2 2 2

Key No.	Part No.	Description	Qty
<b>SWITCH PCB ASS'Y</b>			
S6	141-4-233T-31600 4-231T-41872 4-235T-68571	P.C. Board Ass'y, Switch Slide Switch Socket 2P	1 1 1
<b>SPEAKER SWITCH PCB ASS'Y</b>			
S4	141-4-233T-31500 4-238T-11600 141-2-368T-11000 4-236T-10273 4-235T-80100	P.C. Board Ass'y, Speaker Switch Rotary Switch Heat Sink Plug Socket 7P	1 1 1 1 1 1
<b>CAPACITORS</b>			
C902 C903 C906 C901 C905 C904		Electrolytic 100µF 35V Electrolytic 47µF 16V Electrolytic 47µF 35V Ceramic 0.01µF 50V +80-20% Electrolytic 1µF 50V Electrolytic 1µF (Nonpolar)	1 1 1 1 1 1
<b>RESISTORS</b>			
R901 R902 R903 R907		Metal 10 ohm ±5% 1/2W Carbon 220K ohm ±5% 1/4W Carbon 15K ohm ±5% 1/4W Metal 470 ohm ±5% 1/2W	1 1 1 1

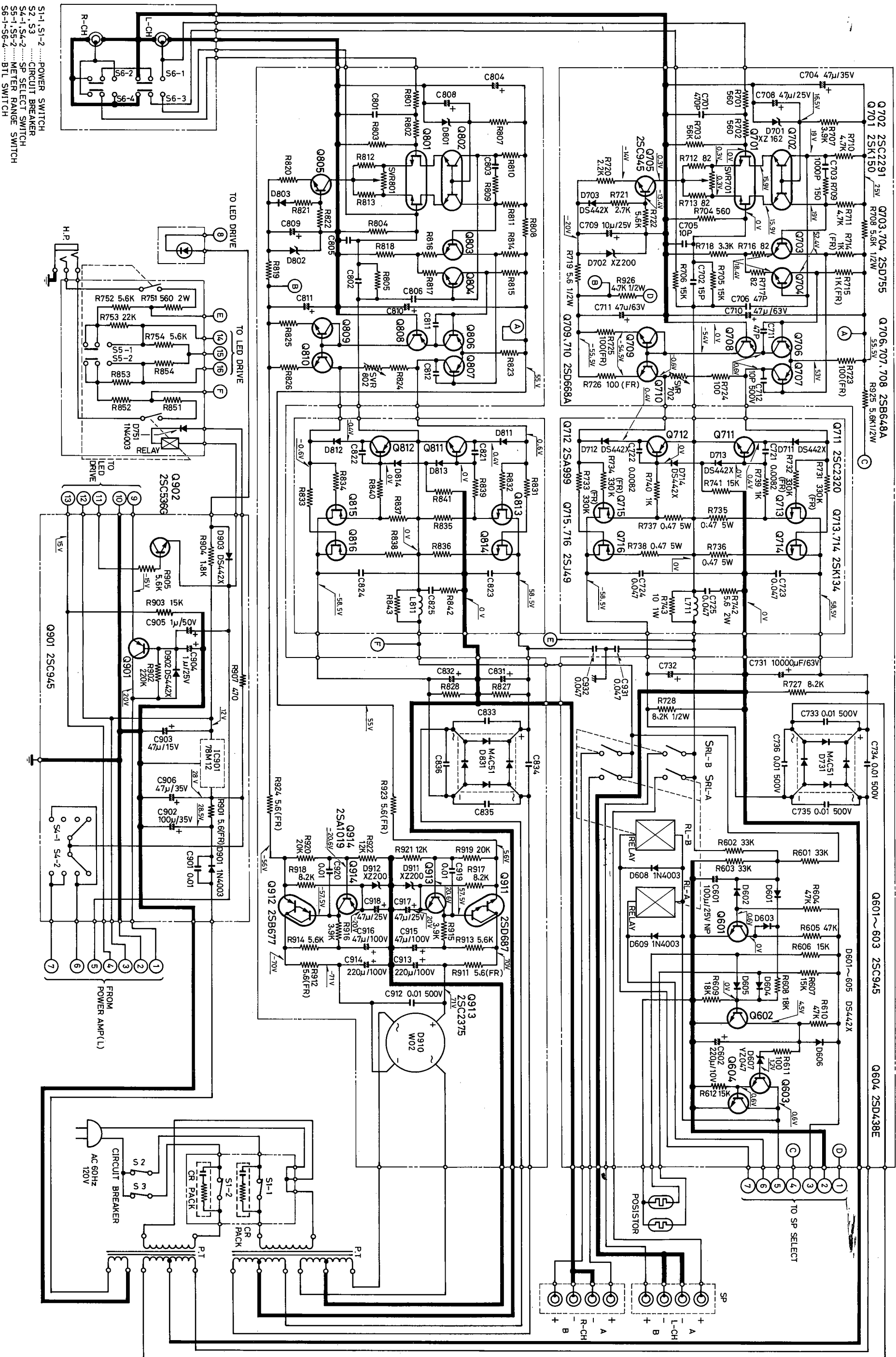
<b>METER RANGE PCB ASS'Y</b>			
S5	141-4-233T-31300 4-238T-02800 4-232T-04500	P.C. Board Ass'y, Meter Range Push Switch Relay	1 1 1
D751 R751,851 R753,853 R752,852, 754,854		Diode 1N4003 ±5% 2W Metal Res. 560 ohm ±5% 1/4W Carbon 22K ohm ±5% 1/4W Carbon 5.6K ohm ±5% 1/4W	1 2 2 4

<b>LED PCB ASS'Y</b>			
87	141-4-233T-31400 141-2-352T-43500	P.C. Board Ass'y LED LED SLP144B Red Spacer	1 1 1

**CHASSIS EXPLODED VIEW**



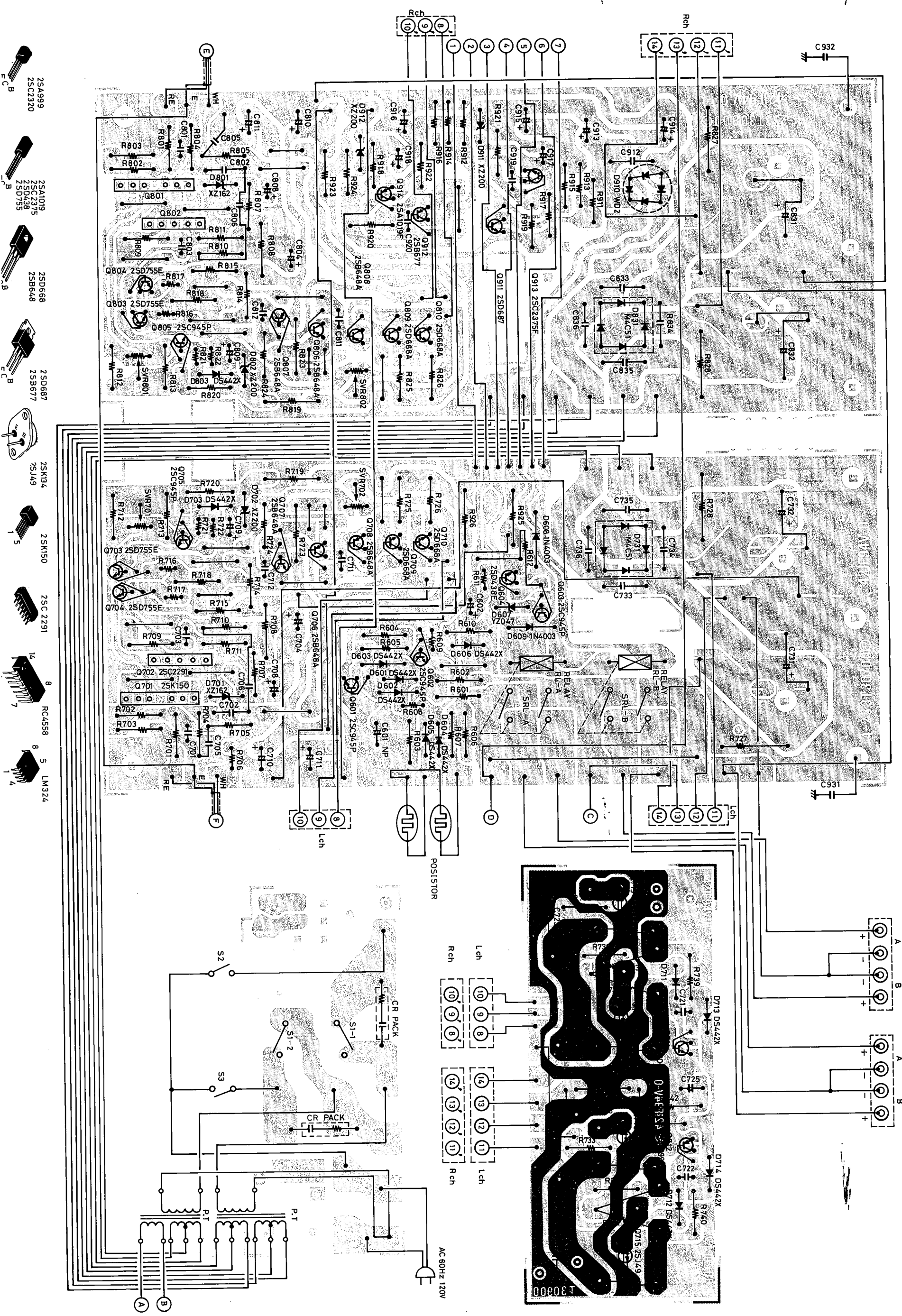
SCHEMATIC DIAGRAM



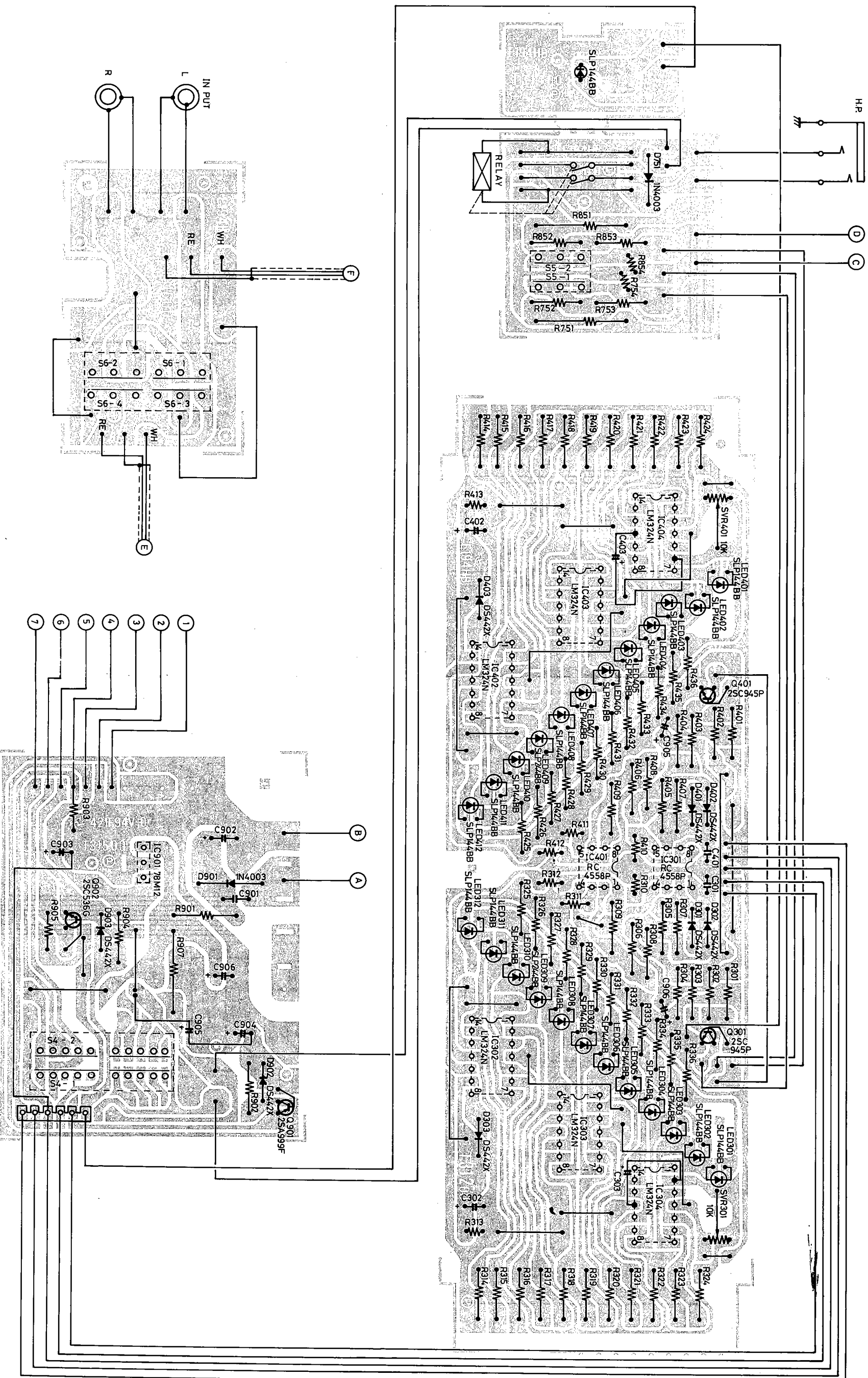
- S1-1, S1-2 ..... POWER SWITCH
- S2, S3 ..... CIRCUIT BREAKER
- S4-1, S4-2 ..... SP SELECT SWITCH
- S5-1, S5-2 ..... METER RANGE SWITCH
- S6-1, S6-2 ..... BTL SWITCH



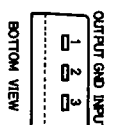
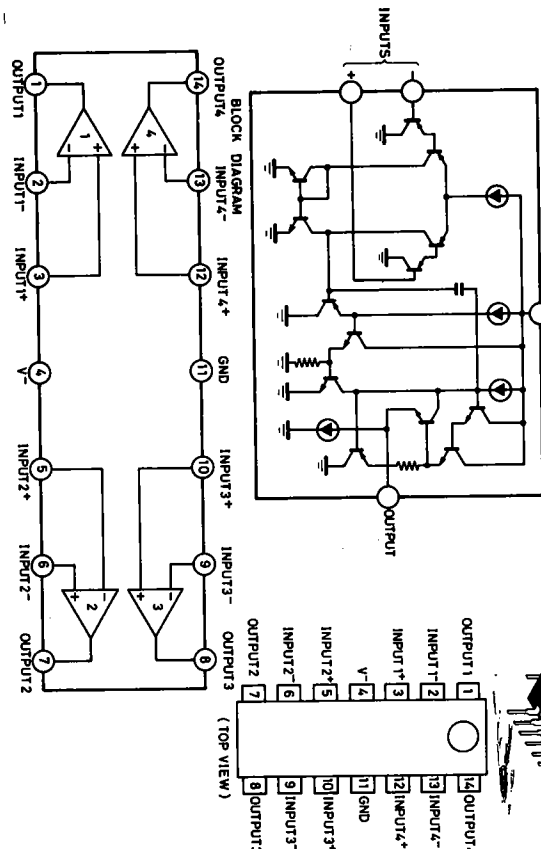
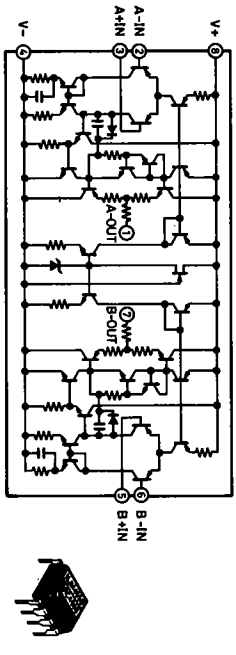
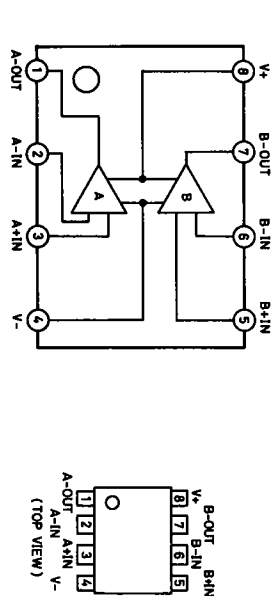
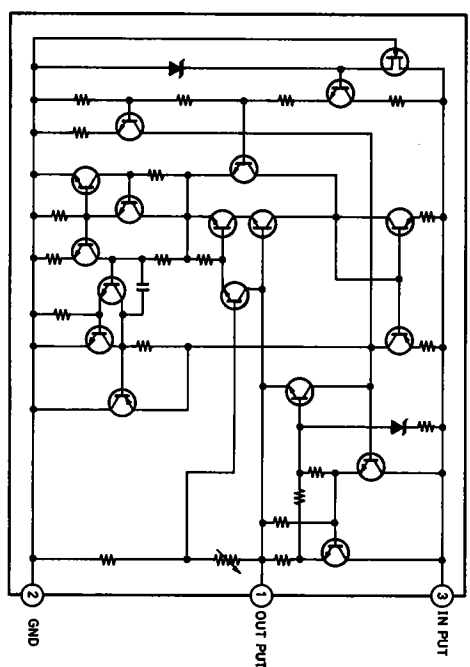
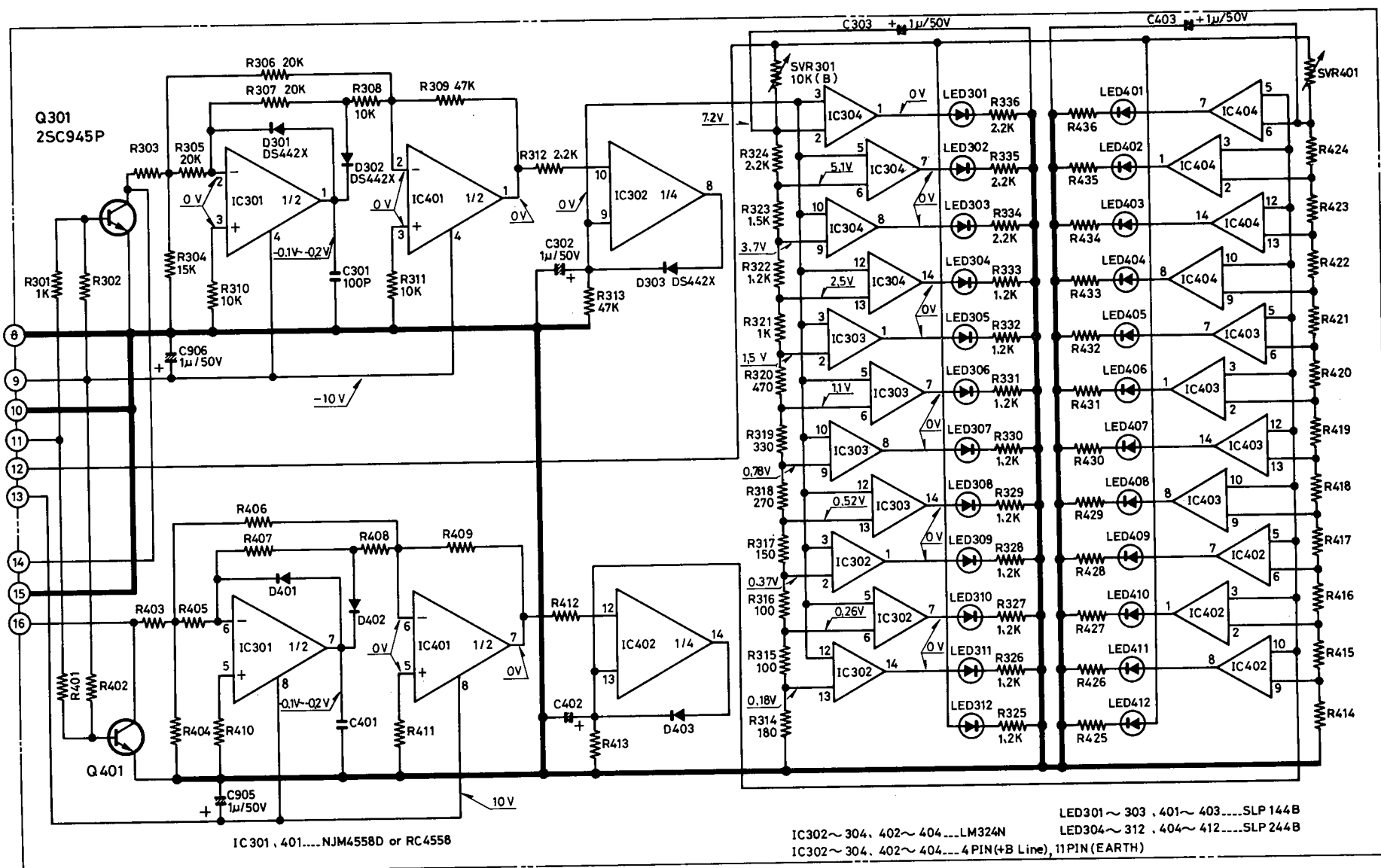
WIRING DIAGRAM



WIRING DIAGRAM



- 25C945  
E C B
- 25C536  
E C B
- 78M12  
OUT PUT  
GND  
IN PUT



## HOW TO REMOVE THE FLUID CONVECTION RADIATOR (EXCHANGER).

Warning: Freon gas under pressure, do not apply heat or flame to exchanger. Do not puncture tubing.

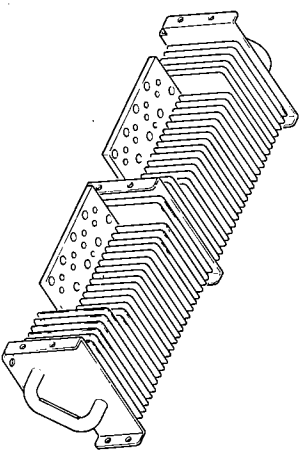
- 1) Loosen three screws (106) found between the exchanger (17) and the back panel, and remove these screws together with three plain washers (114).
- 2) Unscrew two screws (106) found between the exchanger (17) and the bottom lid.
- 3) By removing screws of Steps 2 and 3, the exchanger (17), PCB's (81 & 82), etc. can be lifted up as a block.
- 4) Unscrew one screw (106) found between the cover (29) and the bracket. Consequently, the cover (29) comes off.
- 5) Loosen four screws (115) two screws (106) found between the PCB's (81 & 82) and the bracket (18 & 19), and remove these screws together with two washers (110). Consequently, PCB's (81 & 82) come off.
- 6) Unscrew six screws (106) found between the brackets (18 & 19) and the exchanger (17). Consequently, the brackets (18 & 19) come off.
- 7) Loosen 16 screws (102) found between the FET's (58 & 59) and the PCB (83), and remove these screws together with 16 spring washers (112). Consequently, eight pieces off FET's (58 & 59) and two sheets of PCB (83) come off.
- 8) Unscrew two screws (105) found between the posistor (57) and the exchanger (17). Consequently, two pieces of posistor (57) come off.
- 9) The exchanger (17) can be removed by carrying out Steps 1 and 8.

NOTES: ● When refitting, do not forget two ceramic

- condensers (52) and mica sheets of FET's.
- When exchanging do not after the exchanger is cooled down by turning off the power switch (or pulling the AC cord out of the consent).

## CAUTIONS ON HANDLING OF THE HEAT LOOP TYPE THERMAL RADIATOR

- 1) When touching the heat pipe during reassembly or repairing of the set, pay attention not to rupture the pipe, etc.
- 2) Refrain from storage where exposed to the weather and the direct rays of the sun or where temperature exceeds 60°C.
- 3) In the case of discarding the set as it no longer becomes usable on account of defective thermal radiator, do not discard the set as it is. First either cut or drill the pipe portion of the thermal radiator with metal saw or drill, for instance, at a well ventilated place to let freon gas and freon liquid out of the pipe, and only then discard the disused set.



### BTL (Balanced Transformerless)

BTL refers to a power amplifier circuit to operate speakers connected to the output interval of two sets of SEPP (Single Ended Push-Pull) circuits driven with antiphase.

